

WHAT IS CLAIMED IS:

1. A thermostat abnormal state detecting apparatus for detecting an abnormal state of a thermostat which is provided in a circulating path for cooling water within an engine based upon both a detected cooling water temperature and a cooling water temperature predicted by a driving condition of the engine, wherein

when a cooling water temperature detected while a predicting operation of said cooling water temperature is commenced satisfies a predetermined temperature condition, an electric motor fan for blowing wind with respect to said circulating path is driven.

2. A thermostat abnormal state detecting apparatus for detecting an abnormal state of a thermostat which is provided in a circulating path for cooling water within an engine based upon both a detected cooling water temperature and a cooling water temperature predicted by a driving condition of the engine, wherein

in such a case that it is so judged that detection precision achieved when said abnormal state detecting operation is carried out is low, under such a condition that an electric motor fan for blowing wind with respect to said circulating path is driven, the abnormal state detecting operation as to the thermostat

is carried out based upon both the detected cooling water temperature and the cooling water temperature predicted by the driving condition of the engine.

3. The thermostat abnormal state detecting apparatus according to claim 2, wherein

such a case that it is so judged that said detection precision is low corresponds to a case that a time period defined by that the cooling water temperature is reached to a predetermined temperature after the abnormal state detecting operation has been commenced is shorter than, or equal to a predetermined time period.

4. The thermostat abnormal state detecting apparatus according to claim 1, wherein:

a temperature gradient of said detected cooling water temperature is calculated based upon a temporal change in said detected cooling water temperature;

a temperature gradient of said predicted cooling water temperature is calculated based upon a temporal change in said predicted cooling water temperature;

a difference between said calculated temperature gradients is calculated; and

when said calculated difference between the temperature gradients is smaller than a predetermined value, said thermostat

abnormal state detecting apparatus judges that said thermostat is brought into an abnormal valve opening state.

5. The thermostat abnormal state detecting apparatus according to claim 1, wherein:

an averaged value of differences between said detected cooling water temperatures and said predicted cooling water temperatures is calculated; and

when the calculated averaged value is smaller than a predetermined value, said thermostat abnormal state detecting apparatus judges that said thermostat is brought into an abnormal valve opening state.

6. The thermostat abnormal state detecting apparatus according to claim 1, wherein:

a temperature gradient of said detected cooling water temperature is calculated based upon a temporal change in said detected cooling water temperature;

a temperature gradient of said predicted cooling water temperature is calculated based upon a temporal change in said predicted cooling water temperature;

an averaged value of differences between said calculated temperature gradients is calculated; and

when said calculated averaged value of the differences between the temperature gradients is smaller than a

predetermined value, said thermostat abnormal state detecting apparatus judges that said thermostat is brought into an abnormal valve opening state.

7. The thermostat abnormal state detecting apparatus according to claim 1, wherein

after said electric motor fan has been driven in an intermittent manner under a predetermined condition, said thermostat abnormal state detecting apparatus judges as to whether or not said thermostat is under an abnormal valve opening state.

8. The thermostat abnormal state detecting apparatus according to claim 4, wherein

when the cooling water temperature detected while said engine is started satisfies said predetermined temperature condition, said thermostat abnormal state judging apparatus judges as to whether or not said thermostat is under said abnormal valve opening state after a predetermined time has elapsed.

9. The thermostat abnormal state detecting apparatus according to claim 1, wherein

a rotation speed of said electric motor fan is changed in response to the driving condition of said engine.

10. The thermostat abnormal state detecting apparatus according to claim 1, wherein

said electric motor fan blows wind with respect to a radiator which is provided in said circulating path.

11. An electronic control apparatus equipped with a thermostat abnormal state judging unit for detecting an abnormal state of a thermostat which is provided in a circulating path for cooling water within an engine based upon both a detected cooling water temperature and a cooling water temperature predicted by a driving condition of the engine, wherein

when a cooling water temperature detected while a predicting operation of said cooling water temperature is commenced satisfies a predetermined temperature condition, an electric motor fan for blowing wind with respect to said circulating path is driven.

12. An electronic control apparatus equipped with a thermostat abnormal state judging unit for detecting an abnormal state of a thermostat which is provided in a circulating path for cooling water within an engine based upon both a detected cooling water temperature and a cooling water temperature predicted by a driving condition of the engine, wherein

in such a case that it is so judged that detection precision achieved when said abnormal state detecting operation is carried

out is low, under such a condition that an electric motor fan for blowing wind with respect to said circulating path is driven, the abnormal state detecting operation as to the thermostat is carried out based upon both the detected cooling water temperature and the cooling water temperature predicted by the driving condition of the engine.

13. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 12, wherein

such a case that it is so judged that said detection precision is low corresponds to a case that a time period defined by that the cooling water temperature is reached to a predetermined temperature after the abnormal state detecting operation has been commenced is shorter than, or equal to a predetermined time period.

14. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein:

a temperature gradient of said detected cooling water temperature is calculated based upon a temporal change in said detected cooling water temperature; a temperature gradient of said predicted cooling water temperature is calculated based upon a temporal change in said predicted cooling water

temperature;

a difference between said calculated temperature gradients is calculated; and

when said calculated difference between the temperature gradients is smaller than a predetermined value, said thermostat abnormal state detecting unit judges that said thermostat is brought into an abnormal valve opening state.

15. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein:

an averaged value of differences between said detected cooling water temperatures and said predicted cooling water temperatures is calculated; and

when the calculated averaged value is smaller than a predetermined value, said thermostat abnormal state detecting apparatus judges that said thermostat is brought into an abnormal valve opening state.

16. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein:

a temperature gradient of said detected cooling water temperature is calculated based upon a temporal change in said detected cooling water temperature;

a temperature gradient of said predicted cooling water temperature is calculated based upon a temporal change in said predicted cooling water temperature;

an averaged value of differences between said calculated temperature gradients is calculated; and

when said calculated averaged value of the differences between the temperature gradients is smaller than a predetermined value, said thermostat abnormal state detecting unit judges that said thermostat is brought into an abnormal valve opening state.

17. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein

after said electric motor fan has been driven in an intermittent manner under a predetermined condition, said thermostat abnormal state detecting unit judges as to whether or not said thermostat is under an abnormal valve opening state.

18. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 14, wherein

when the cooling water temperature detected while said engine is started satisfies said predetermined temperature condition, said thermostat abnormal state judging unit judges



as to whether or not said thermostat is under said abnormal valve opening state after a predetermined time has elapsed.

19. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein

a rotation speed of said electric motor fan is changed in response to the driving condition of said engine.

20. The electronic control apparatus equipped with a thermostat abnormal state judging unit according to claim 11, wherein

said electric motor fan blows wind with respect to a radiator which is provided in said circulating path.